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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/521,242	01/14/2005	Miki Ogawa	03500.017473.	7202
5514 7590 09/16/2010 FITZPATRICK CELLA HARPER & SCINTO 1290 Avenue of the Americas NEW YORK, NY 10104-3800				
EXAMINER				
EMPIE, NATHAN H				
ART UNIT		PAPER NUMBER		
1712				
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/521,242

**Applicant(s)**

OGAWA, MIKI

**Examiner**

NATHAN H. EMPIE

**Art Unit**

1712

**Period for Reply** -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 29 July 2010 and 06 August 2010.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1,3,5,17 and 18 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,3,5,17 and 18 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB06)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ ~~Notice of Informal Patent Application~~
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submissions filed on 7/29/10 and 8/6/10 have been entered. Claims 1, 3, 5, 17, and 18 are currently pending.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1, 3, 5, 17, and 18 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claims 1 and 17 have been amended to recite: "...retaining the substrate in a water vapor containing atmosphere having a relative humidity from 70% to 100% for at least 5 hours...". Applicant's specification appears to support such a treatment only at exactly a time period of 5 hours (see, pg 36 lines 22-26 of applicant's specification), the specification does not

describe performing such processing at all or any values above 5 hours, nor does it discourage performing such processing at values below the 5 hour threshold.

The other dependent claims do not cure the defects of the claims from which they depend.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 18 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 18 recites : "...wherein *the step of retaining the substrate*, the substrate..." In claim 1 from which claim 18 depends recites two steps of "retaining the substrate" ("(b)" and "(c)") making it uncertain as to which of the two steps claim 18 is directed to. As the further limitation of claim 18 is directed to "crystallizing the tin oxide", it would appear to align with step "(c)" (see, pg 24 lines 11-26 of specification). So for purposes of examination the limitation: "...wherein *the step of retaining the substrate*, the substrate..." will be interpreted as "...wherein *the step of retaining the substrate in a water vapor containing atmosphere having a relative humidity from 70% to 100%*, the substrate...".

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 3, 5, 17, and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Stucky (WO 99/37705; hereafter Stucky) in view of Crepaldi et al. ("Design and Post-Functionalisation of Ordered Mesoporous Zirconia Thin Films" Chemical Communications, 2001, pg 1582-1583; hereafter Crepaldi), Imai et al "Structural Changes in Sol-Gel Derived SiO<sub>2</sub> and TiO<sub>2</sub> Films by Exposure to Water Vapor" J. Sol-Gel Science and Technology 10 (1997) pg 45-54; hereafter Imai), and Miyata et al. ("Alignment of Mesoporous Silica on a Glass Substrate by a Rubbing Method" Chem. Mater. V11 (1999) 1609 – 1614; as provided in applicant's IDS dated 9/29/05; hereafter Miyata).

Claim 1, 3, 5, 17, and 18: Stucky teaches a method for manufacturing a mesoscopically ordered, mesoporous structured films and monoliths (of metal oxides such as SiO<sub>2</sub>, SnO<sub>2</sub>, ZrO<sub>2</sub>, TiO<sub>2</sub> etc) (abstract, pg 18 lines 20 – pg 19 line 30, pg 36 line 24 – pg 37 line7) comprising the steps of:

preparing a reactant solution that contains a metal precursor material for forming mesostructured films which contain a metal oxide (see, for example, TEOS (pg 36 line24 – pg 37 line7), or metal chlorides (such as, SnCl<sub>4</sub>, listed in pg 65, Table 3)), amphiphilic materials such as a non-ionic surfactant (see, for example, C<sub>16</sub>H<sub>33</sub>(OCH<sub>2</sub>CH<sub>2</sub>)<sub>10</sub>OH (C<sub>16</sub>EO<sub>10</sub>) (cetyl hydrophobic group) and numerous other non-ionic alkyl polyethylene oxide (polyoxyethylene-ether) surfactants (pg 38 lines 21 –30, pgs 63-64, Table 2) or amphiphilic poly(alkylene oxide) block copolymers (see, for

example, PEO-PPO-PEO pg 18 lines 20 – pg 19 line 30)) and a solvent (such as ethanol) (See, for example, pg 42 lines 10 – 21);

applying the reaction solution onto a substrate by a process such as spin-, drop-, or dip-casting (see, for example, (pg 36 line 24 – pg 37 line 7), (pg 42 lines 8 – 23)).

Stucky teaches an aging time to allow the solution to gel, and drying of gel (see, for example, (pg 42 lines 8 – 23)). Stucky further teaches that in the processes of forming these mesoporous films and monoliths, synthetic conditions such as the humidity can be modified to impact the resulting structure of the film (pg 46 lines 5 – 13), thereby recognizing humidity as a result effective variable. Also Stucky mentions that modifications including additional heat treatments following gelation can produce harder materials that are less likely to crack, but Stucky is silent as to the specifics of such treatments (pg 39 lines 1 – 7), so Stucky does not explicitly teach retaining the substrate onto which the reaction solution has been applied in an atmosphere having a relative humidity of from 10% to 30 % to dry the solvent in the reaction solution; then forming the mesostructured film at a temperature of 100°C or less in a vapor-containing atmosphere at a relative humidity in a range of from 70% to 100% to orient the plurality of assemblies of the surfactant in a predetermined direction, thereby improving regularity of a mesostructure of the mesostructured film. Crepaldi teaches a method of forming mesoporous zirconia thin films (See, for example, abstract). Crepaldi further teaches the importance of a post functionalisation process, as well as importance that a multi-treatment / exposure to varying relative humidity environments post deposition play (See, for example, pg 1582 – 1583). Crepaldi has taught a solvent drying

processes at 60°C, as well as demonstrating that temperature is a result effective variable (See, for example, pg 1582-1583). Crepaldi specifically teaches that the best optical quality and organization was obtained via a two -step initial drying - aging process wherein a sol-gel film, is initially dried at 10% relative humidity, is then exposed to a high humidity atmosphere (>80% RH) wherein the incorporation of water aids organization (see, for example, pg 1583). Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to have incorporated a preliminary solvent drying step at 10% RH followed by exposure to water vapor containing high humidity environment of >80% RH as taught by Crepaldi, into the process of forming a sol-gel derived coating, as taught Stucky, as Stucky describes humidity as result effective variables for his process, as well as introducing additional heat treatments, but is silent as to specific conditions of each, and Crepaldi teaches the conditions of a two-step low, then high humidity treatment step that results in improved optical quality.

Stucky in view of Crepaldi does not explicitly teach that the step or retaining the substrate in a water vapor containing atmosphere having a relative humidity of from 70% to 100% is for a duration of at least 5 hours. Imai teaches a method of forming sol-gel derived metal oxide coatings such as SiO<sub>2</sub> and TiO<sub>2</sub> (See for example, abstract, pg 45-47). Imai further teaches that it is well known in the art that treating dried sol-gel derived films in high-humidity environments influences and induces structural change and crystallization of the films (See, for example, abstract, pg 46-48). Imai further teaches duration of such exposure occurring at time periods of 12, 24, and 48 hrs, and

further teaches that the duration of high humidity treatment is a result effective variable influencing the coating structure and various properties (See, for example, Fig 1 - 8, pg 45 - 53). Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to have incorporated conducting the step or retaining the substrate in a water vapor containing atmosphere having a relative humidity of from 70% to 100% for a duration within the claimed range since Imai has taught that the duration of high humidity is a result effective variable influencing the resulting structure and properties of the film and since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Stucky in view of Crepaldi and Imai do not explicitly teach the temperature of the claimed "forming" step / step of retaining the substrate in a water vapor-containing atmosphere, the examiner asserts that conventionally when certain conditions such as temperature are not explicitly taught in the prior art, it is common to practice STP (standard temperature and pressure) (so about room temperature, ~25°C), further the prior art have further identified temperature as a result effective variable, so it would have obvious to one of ordinary skill in the art to have incorporated the claimed forming process at a temperature within the range of 100°C or less/ 15°C to 100°C since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). Additionally, with respect to the resulting limitation of claim 18 to crystallize the tin oxide in a pore wall, Imai has



further taught that it is well known that treatment in high humidity environments induces crystallization (See, for example, pg 45-47), and further since the method of Stucky in view of Crepaldi and Imai have taught the claimed steps including similar reactants, such a resulting crystallization process is inherent to the taught process. Where the claimed and prior art products are identical or substantially identical in structure or composition, or are produced by identical or substantially identical processes, a prima facie case of obviousness has been established, *In re Best*, 195 USPQ 430, 433 (CCPA 1977).

Stucky in view of Crepaldi and Imai teaches all the features of these claims except for the limitations directed to the substrate having a capability of / and orienting a plurality of assemblies of the amphiphilic material in a predetermined direction. Stucky further teaches that the reaction solution can be applied onto a substrate (such as glass) by a process such as spin-, drop-, or dip-casting (see, for example, (pg 36 line 24 – pg 37 line 7), (pg 42 lines 8 – 23)). Miyata teaches a method of preparing a film of mesoporous material (silica, from a TEOS / surfactant reactant solution) on a coated glass substrate (see, for example, pg 1609-1610, Abstract, and "Experimental Section"). The glass substrate is provided with a polyimide film that is treated with rubbing which gives alignment control to the substrate, which is taught as desirable in that it provides an ordered mesoporous films with aligned channels (see, for example, pg 1610, first col, and "Experimental Section"). The result of the film formation process is an aligned structured with oriented channels aligned with respect to the substrate. It would have been obvious to one of ordinary skill in the art at the time of invention to have

incorporated using a glass substrate provided with a precoating of a rubbed polymer film, as taught by Miyata, as the glass substrate taught in the method of Stucky in view of Crepaldi and Imai as it would provide a desirable ordered alignment of the for the mesostructured / mesoporous coating. Such an incorporation would result in a method which would possess a substrate having a capability of orienting aggregate of the amphiphilic material, and one wherein the assemblies of the amphiphilic material would be oriented in the predetermined (rubbing) direction.

Claim 17 further: Stucky further teaches removing the surfactant (amphiphilic material) to form a pore (see, for example, calcination step, pg 42 lines 19 - 23).

### ***Response to Arguments***

Applicant's recent submission of 8/6/10 has been entered and is sufficient to perfect the claimed foreign priority of JP2002-233026 filed Aug 9, 2002. As a result, previously applied Miyata2 is no longer prior art, so the rejections of claims 1,3,5, and 17 under 35 USC 103(a) over Miyata2 in view of Miyata have been withdrawn.

Applicant's remaining arguments filed 7/29/10 have been fully considered but they are not persuasive. Applicant's arguments that the references do not teach the newly added limitations are unconvincing in view of newly-cited Imai, as discussed above.

As to the dependent claims, they remain rejected as no separate arguments are provided.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to NATHAN H. EMPIE whose telephone number is (571)270-1886. The examiner can normally be reached on M-F, 6:45- 4:15 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Cleveland can be reached on (571) 272-1418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Nathan H Empie/  
Examiner, Art Unit 1712